日本産ヒゲジロハサミムシに便乗するヒゲダニ

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A Histiostomatid Associated with a Common Earwig, *Gonolabis marginalis* (Dohrn) (Dermaptera: Anisolabididae) in Japan

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ABSTRACT

A histiostomatid, colonized from a most common Dermaptera, *Gonolabis marginalis* Dohrn, 1864 (Anisolabididae) in central Japan, was studied taxonomically. In spite of a discrepancy, shorter leg I tarsus in the deutonymph, it was identified as *Histiostoma mahunkai* Fain, 1974. Taxonomic information, on the male and female, recorded in this article. The most records on *Histiostoma* phoresy on Dermaptera have been one-sided on *H. polypori* Oudemans, 1900 and *H. feroniarum* (Dufour), 1839 on a European Dermaptera, *Forficula auricularia* Linnaeus, 1758 (Forficulidae). Very recently, three other phoretic species of histiostomatids recorded from three Australian giant earwigs, *Titanolabis colossea* Dohrn, 1864 (Anisolabididae). This species, *H. mahunkai*, was the first record from Japan, and the combination was also the first record with Dermaptera.

Key words: phoresy, mites, *Histiostoma*, length ratio, measurements

INTRODUCTION

Earwigs (Dermaptera) are common in both natural and semi-natural habitats world-wide (Popham, 2000), and are phoretic carriers of several groups of mites including Histiostomatidae (Tagami and Halliday, 2013). Previous records of Histiostomatidae phoretic on an European earwig, *Forficula auricularia* Linnaeus, 1758 (Forficulidae), include *Histiostoma polypori* (Oudemans), 1914 from The Netherlands (Oudemans, 1914), Scotland (Behura, 1957), Poland (Chmielewski, 2009, 2010), and Italy (Wirth, 2009), and *H. feroniarum* (Dufour), 1839 from Poland (Chmielewski, 2009, 2010). Recently several species of Histiostomatidae were found phoretic on the Australian giant earwig *Titanolabis colossea* Dohrn, 1864 (Dermaptera, Anisolabididae) –*H. feroniarum*, *H. australiense* Mahunka, 1975, *H. humiditatis* (Vitzthum), 1927, and *H. tetanolabi* Tagami and Halliday, 2013, all from New South Wales, Australia (Tagami and Halliday, 2013).

It is well known that histiostomatids are often phoretic on Japanese Dermaptera, but the species have not previously been identified. As a preliminary assessment of the extent of this

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association in Japan, a common earwig collected in Tsuchiura, Ibaraki Prefecture was examined. The earwig was killed by body separation and put the parts on paper disc which immersed water disinfected with 20mg/l chlorine (Tagami and Kuwahara, 2005). It is not clear how many deutonymphs are attached on the earwig. Their three stages, the deutonymph, adult female and male, are illustrated and identified as *Histiostoma mahunkai* Fain, 1974. The adult female and male are described for the first time.

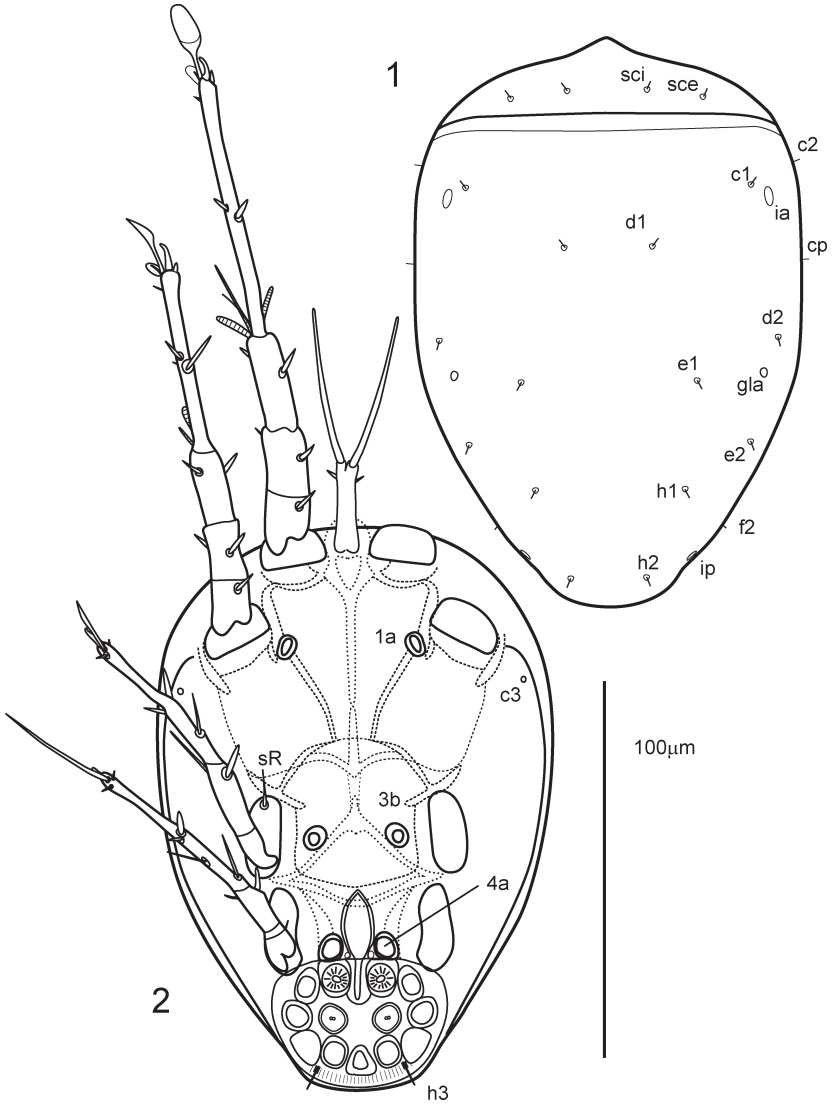
Histiostoma mahunkai Fain, 1974

Specimens examined. Six deutonymphal, six female, and five male specimens from a culture established from an earwig, *Gonolabis marginalis* Dohrn, 1864 (Dermaptera: Anisolabididae) collected in Takaoka, Tsuchiura, Ibaraki Prefecture, central Japan, on 22 May 2011. Six deutonymphs; NSMT-Ac 13709 -13714, six females; NSMT-Ac 13715 - 13720, and five males; NSMT-Ac 13721 - 13725, are deposited in Collection of Arachnida of the Department of Zoology, National Museum of Nature and Science, 4-1-1, Amakubo, Tsukuba, Ibaraki 305-0005, Japan. The host Dermaptera and photos used for drawings are also deposited in the collection as additional data of the voucher specimen. RLI (Relative Length of Idiosoma), % ratio of length or width of the characteristics in the specimens, was used in this paper (Kurosa, 1987).

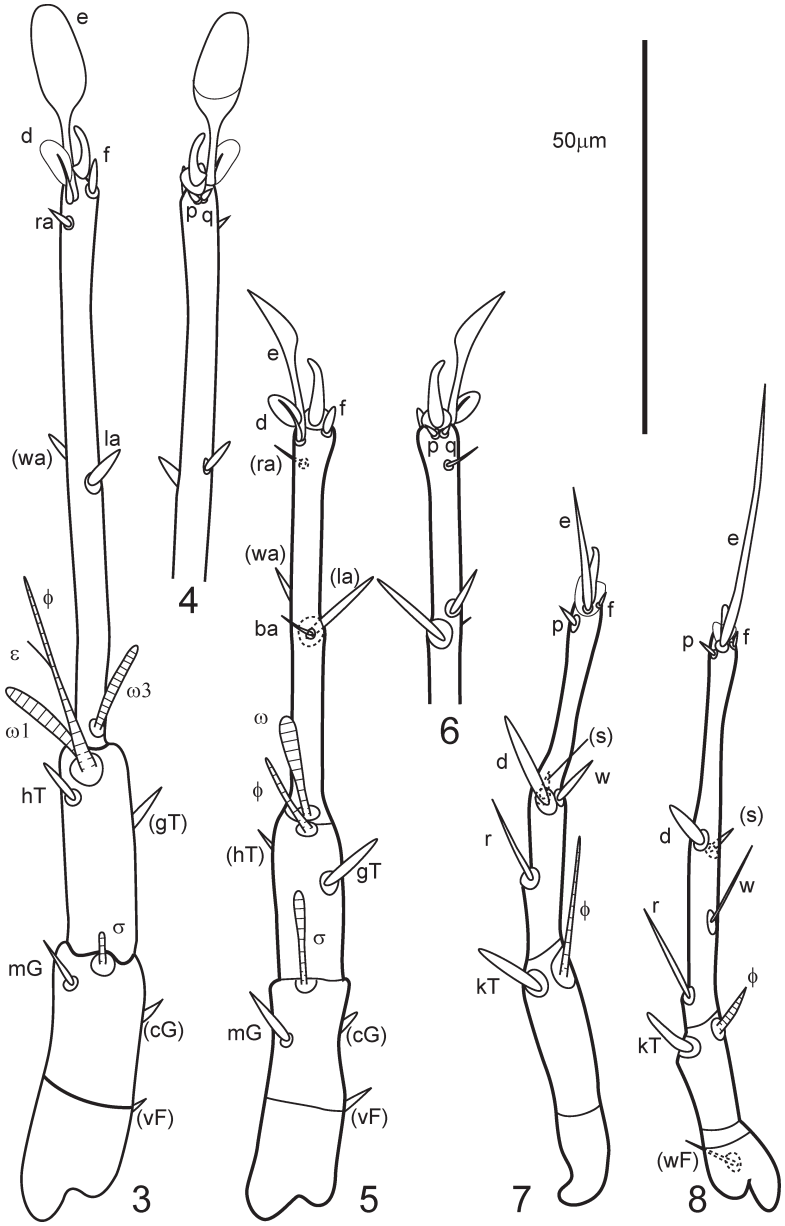
Descriptions. *Deutonymph* (Figs. 1-8). Long-legged and shield-shaped idiosoma, idiosomal length 151 - 213 µm, hysterosomal width 114 -169 µm. Gnathosoma elongate. Dorsal propodosoma pointed anteriorly (Fig. 1), without faint striations to its anterior margin. Dorsal hysterosoma not ornamented or shagreened. All dorsal setae minute, *c3* disc with no seta, *h3* longest. Ventral coxal setae *1a*, *3b*, and *4a* conoidal, and normal in size (Fig. 2). Sucker plate small, length; RLI = 20 - 22, width; RLI = 27 - 31. Legs (Figs. 3 - 8): Leg I longest (RLI = 80 - 85); tarsus I especially long (RLI = 44 - 48). Tibia I solenidion (ϕ) short, its apical end not reaches seta *la*. Leg II normal for genus (RLI = 60 - 64). Leg III and Leg IV normal, except apical tarsal seta *q* invisibly small.

Female (Figs. 9 - 14). Idiosoma length 405 - 445 µm, hysterosoma width 260 - 275 µm. Dorsal hysterosoma smooth, and lacks *h2* seta, anterior and posterior propodosoma almost smooth. Copulatory opening very small and circular. All dorsal setae thick and long as two times of tibia I and ventral setae fine but long (Figs. 9, 10). Ventral idiosoma with two pairs of ring like structures (*r1* and *r2* in Fig. 10), the anterior pair strong, the posterior pair elongate at the level of the posterior end on coxae IV. Ventral view of trochanter II arched or curved (Fig. 10).This species has all the leg characters of genus *Histiostoma* (Figs. 11 - 14). Leg I solenidia, $\sigma 1$ and $\sigma 2$, longer than tibia I in length (Fig. 11).

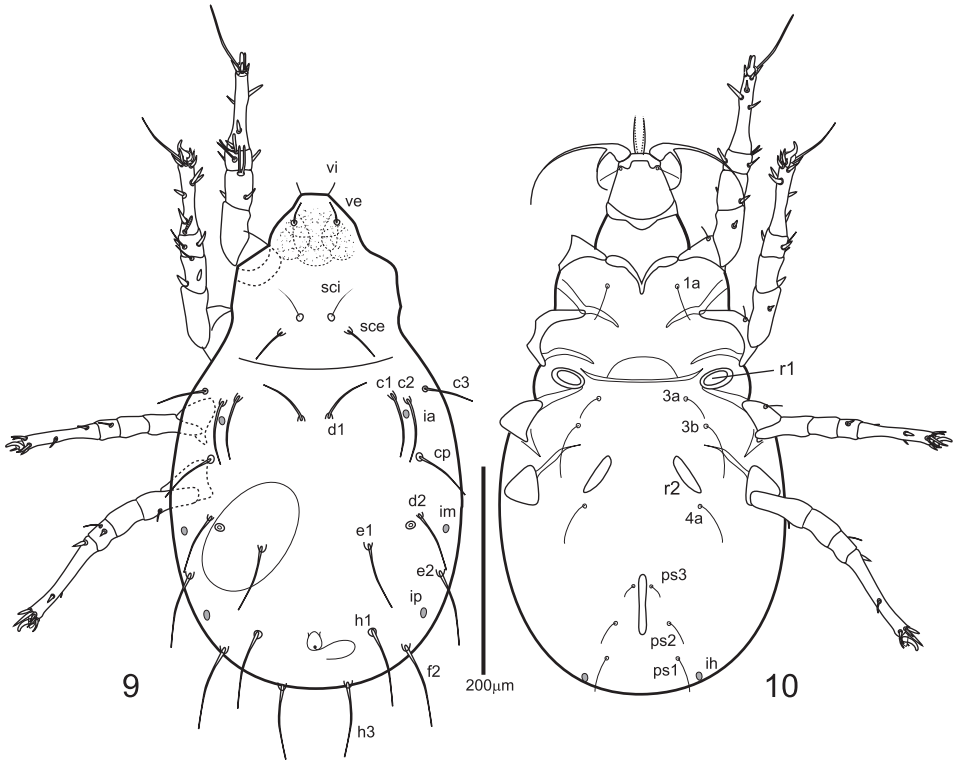
Male (Figs. 15 - 20). Idiosomal length 293 - 298 µm, hysterosomal width 158 - 160 µm. Dorsal surface of propodosomal shield shagreened posteriorly more than that of normal for genus. Two pairs of hysterosomal shields in different shape, anterior large circle and posterior small elongate distinctly shagreened. Dorsal setae no longer than double the length of tibia I. Seta *h2* lacks as female (Fig. 15). Ventral coxal seta *1a* slender than other ventral setae. Ventral setae *3a* and *3b* located posterior edge of coxa III, and *3b* closed to anterior end of *r1*. The posterior ring (*r2*) larger than anterior one, located outside of genital accessory (Fig. 16).



Figs. 1-2. *Histiostoma mahunkai* Fain, 1974, deutonymph habitus. 1, dorsal view ; 2, ventral view.



Figs. 3-8. *Histiostoma mahunkai* Fain, 1974, deutonymph, left legs. 3, leg I, dorsal view; 4, leg I, apical tarsus (ventral view); 5, leg II, dorsal view; 6, leg II apical tarsus (ventral view); 7, leg III, side view; 8, leg IV, side view.



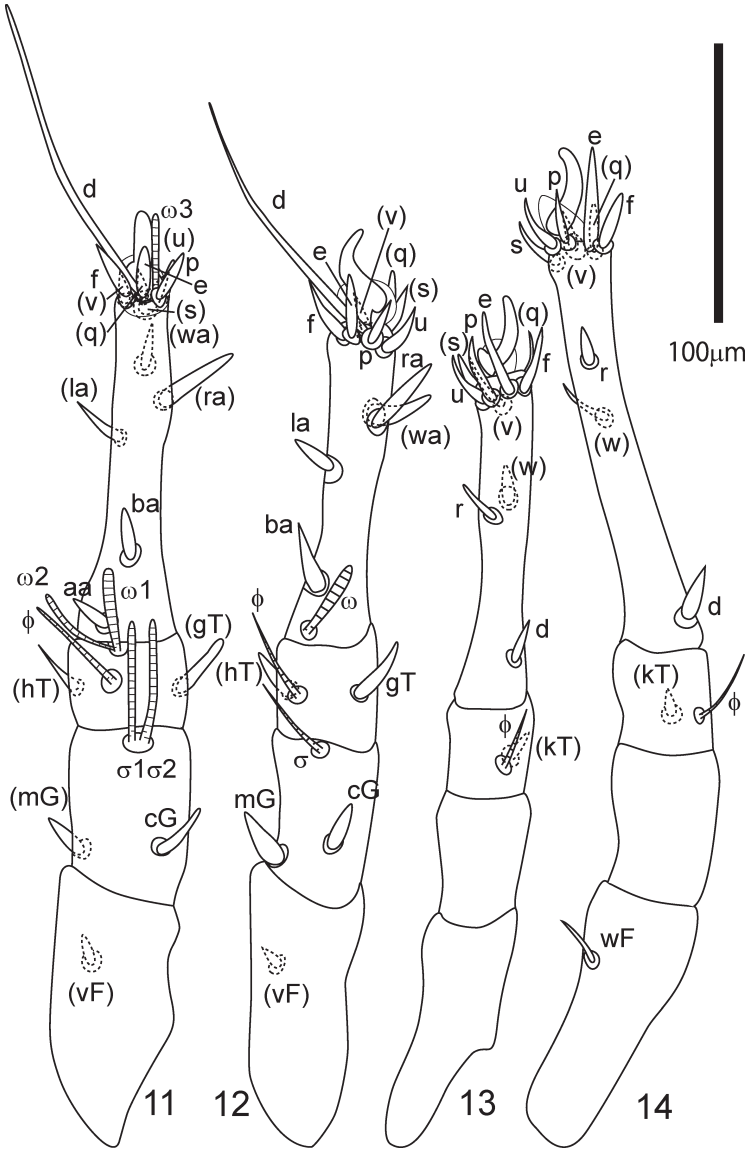
Figs. 9-10. *Histiostoma mahunkai* Fain, 1974, adult female habitus. 9, dorsal view; 10, ventral view.

Tarsi leg I - IV thicker and shorter than those of the female. Ventral tarsal setae *wa* of leg I and II shift posteriorly. These two differences are gender specific, i.e., sexual dimorphism (Figs. 17-20).

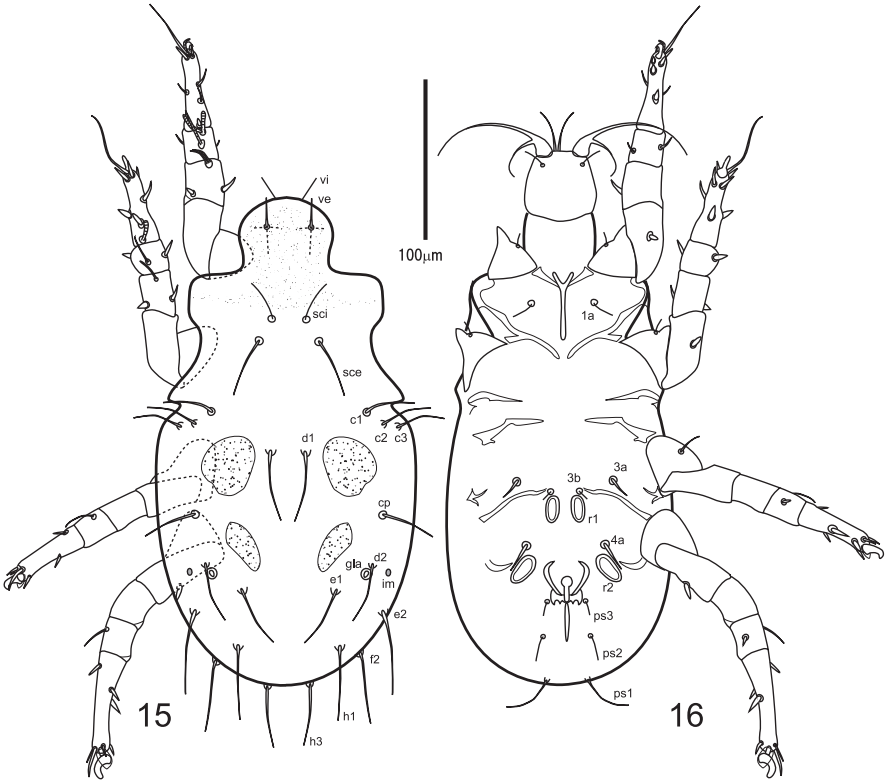
DISCUSSION

The deutonymphs of *H. mahunkai* was described from soils in Côte d'Ivoire, Africa (Fain, 1974). It is similar to *H. longipes* (Oudemans, 1911) from a blattid in Java, Indonesia, in body size, shape of propodosoma, relatively long legs I and II, smooth hysterosoma, and minute dorsal setae. However, *H. longipes* has longer leg I (RLI = 94) and tarsus I (RLI = 57), and tarsus I solenidion ϕ longer than *mahunkai*. The deutonymph of *H. mahunkai* also has longer leg I (RLI =94), longer tarsus I (RLI = 52), but not so long ϕ on leg I. The Japanese deutonymphal specimens have shorter leg I (RLI = 84) and tarsus I (RLI = 46) than *longipes* or *mahunkai*. However, it has a similar arrangement of dorsal hysterosomal setae, and length of ϕ on leg I are in common with *mahunkai*. Therefore, they must be identified as *H. mahunkai*.

The female adult of *mahunkai* is morphologically similar to *H. humiditatis* and *H. nigrellii*



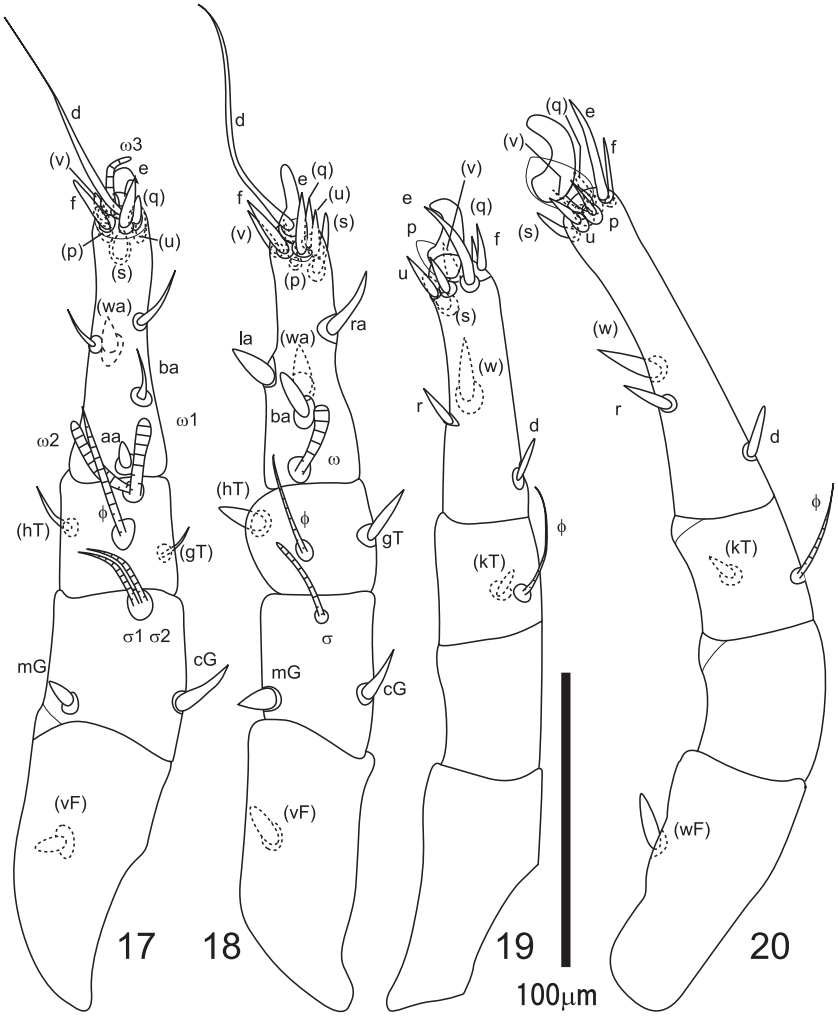
Figs. 11-14. *Histiostoma mahunkai* Fain, 1974, adult female, leg dorsal views. 11, leg I; 12, leg II; 13, leg III; 14, leg IV.



Figs. 15-16. *Histiostoma mahunkai* Fain, 1974, adult male habitus. 15, dorsal view; 16, ventral view.

Hughes and Jackson, 1958 by the keys of Hughes and Jackson (1958). However, they have12 pairs of shorter hysterosomal setae and ventral *4a* seta is located inside of *r2*. The female of *H. myrmicarum* Scheucher, 1957 is also another similar species to *mahunkai*. However, its ventral seta *3a* is located closer to *r1*, *4a* is located as the previous two species, and anal seta *ps1* is thicker and longer than *mahunkai*. The male of *H. nigrellii* is also similar to the male of this species. However, *nigrellii* has developed leg I, 12 pairs of shorter dorsal setae, smaller *r2*, shorter *4a*, and smaller copulatorix. *H. humiditatis* is thelytokous. The male of *H. myrmicarum* is also similar to *mahunkai*. However, *myrmicarum* has smooth dorsal hysterosoma, and fine ventral setae *3a* and *4a*.

For 100 years after Oudemans' studies on histiostomatids phoretic on earwig, only two species, i.e., *H. polypori* and *H. feroniarum*, have been recorded from Forficulidae only in Europe. However, recent record of common histiostomatids (*H. feroniarum*) on Australian earwigs (Tagami and Halliday, 2013) and new record of *H. mahunkai* from Japan in the present study indicate that some species of phoretic histiostomatids on earwigs may have worldwide distribution. In addition to *H. feroniarum*, in Australia, 3 other species have been recorded from Australian giant earwigs (Tagami and Halliday, 2013). These records may be valuable for future



Figs. 17-20. *Histiostoma mahunkai* Fain, 1974, adult male, leg dorsal views. 17, leg I; 18, leg II; 19, leg III; 20, leg IV.

study of biogeography and coevolution on histiostomatids associated with earwigs; for examples, effect of continental drift to distribution of mites, history of vicariance and dispersal, adaptive radiation after vicariance, and so on.

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摘要

日本産ヒゲジロハサミムシに便乗するヒゲダニ

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本邦産のヒゲジロハサミムシ *Gonolabis marginalis* Dohrn, 1864（Dermaptera: Anisolabididae）に便乗しているヒゲダニの第二若虫を飼育して得られた第二若虫を第 1 脚長が短いと言う相違はあるが *Histiostoma mahunkai* Fain, 1974 と同定した．また，飼育から得た雌雄成虫形態を記載した．ハサミムシに便乗するヒゲダニに関する知見は，欧州産の *H. polypori* と *H. feroniarum* に偏っていたが，最近になって豪州産の 3 種類が追加され本種が新たに加わった．本種はアフリカのコートジボワールが原記載地である．ハサミムシとヒゲダニの便乗関係を更に詳細に調べる必要がある．